

Y2K CATALOGUE



**CRYSTALS, OSCILLATORS VCXO
TCXO**

**About Bright Star
Crystals Pty. Ltd.**



ABN No 90 004 849 245

BRIGHT STAR CRYSTALS PTY.LTD.

1/9 HI-TECH PLACE ROWVILLE VIC 3178
PO BOX 335 VERMONT VIC 3133. AUSTRALIA
PHONE 03 9764 1311 FAX 03 9764 1602

Return to cover

17 April, 2000

COMPANY PROFILE

BRIGHT STAR CRYSTALS PTY. LTD. is a manufacturer and importer of **High precision** Quartz Crystals, Quartz Crystal Oscillators and related products.

Established in 1934 as Bright Star Radio and incorporated with a name change in 1970 to Bright Star Crystals Pty.Ltd, and moving to our new production facility in 1988 our production has grown from 10,000 to more than 50,000 units per year, this has been achieved by strict attention to **quality and customer service**.

Manufacturers who meet our quality standards (not necessarily the cheapest) supply all Imported units and materials.

Bright Star Crystals are currently installing AS3902 90% complete and operating (all Manuals work instructions etc are in place).

Structure

Managing Director and Quality Assurance Manager
Director/Secretary
Production team leader
Quality Assurance officer / materials purchasing
Sales and Accounts
Total Staff 14

Mr David Wright
Miss Janine Wright
Mr Gary Blundell
Mrs Diane Burrridge
Mrs Diane Burrridge

Product range

As per our Catalogue or Line card.

Bright Star Crystals Pty. Ltd customers include

Commscraft Manufacturing Pty. Ltd
Telspec Pty. Ltd.
Siemens Ltd (aust)
JNA Pty. Ltd.
Hartec Pty. Ltd.
NEC Australia Ltd.

and many other smaller companies throughout Australia.



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BSC2000

CATALOGUE INDEX

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8	HC49S STANDARD CRYSTAL HC9S LOW PROFILE
9	INSULATING WASHERS HC51U, HC49U, UMI/ UM5
10	DT26 / DT38 WATCH TYPE TUNING FORK TYPE 32.768 KHz

OSCILLATORS THROUGH HOLE

11	PXO1812	OSCILLATOR 33 TO 160 MHz	14 PIN DIL HIGH SPEC TRI-STATE
12	PXO1813	OSCILLATOR .0001 TO 160 MHz	14 PIN DIL H-MOS TRI-STATE
13	PXO1815	OSCILLATOR 1.8 TO 160 MHz	14 PIN DIL HIGH SPEC TRI-STATE -OPTION
14	PXO1815A	OSCILLATOR .1 TO 160 MHz	14 PIN DIL HIGH SPEC 3.3 VOLT TRI-STATE
15	PXO1817	OSCILLATOR 32K768 / 4M194304	14 PIN DIL (LOW POWER)
16	PXO1817-LP	OSCILLATOR 30KKH to 10MHZ	14 PIN VERY LOW POWER TRI-STATE
17	PXO1818	OSCILLATOR .125 TO 2 MHz	14 PIN DIL (LOW POWER)
18	PXO1819	OSCILLATOR .125 TO 105 MHz	8 PIN DIL H-MOS TRI-STATE
19	PXO1822	OSCILLATOR 1.8-32 MHz	8 PIN DIL H-MOS ? 5PPM -10 TO 65°C

VOLTAGE CONTROLLED THROUGH HOLE

20	VCXO1812	VCXO OSC 5 TO 32 MHz	14 PIN VOLTAGE CONTROLLED
21	VCXO1812	VCXO OSC 30 TO 160 MHz	14 PIN VOLTAGE CONTROLLED
22	VCTCXO1800	Voltage controlled temperature compensated oscillator 10-24 MHz with clipped sine wave or pure sine wave	
23	VXO1803	VCXO 500Hz TO 4MHz	14 PIN LOW FREQUENCY VOLTAGE CONTROLLED
24	VCO	VCO 25 TO 1025 MHz	WIDE RANGE (NOT CRYSTAL)
25	VXO1819	VCXO 4-33 MHz	8 PIN VOLTAGE CONTROLLED

CRYSTALS SURFACE MOUNTED

26	CM309	SMD CRYSTAL	SIMILAR TO MG3A
27	HC48US-P	SMD CRYSTAL	REPLACEMENT FOR MG3A/CM309
28	T2 (A or B)	SMD CRYSTAL 32.768 KHz	SMD BLOCK EXTRA SMALL
29	SX01	SMD CRYSTAL 3.2 TO 70 MHz	SMD BLOCK
30	HC49/US	HC49S SMD	SURFACE MOUNTING

OSCILLATORS SURFACE MOUNTED

31	SMO-150	SMD OSC 1.8 TO 70 MHz	SMD BLOCK H-MOS/TTL
32	SMO-170	SMD OSC 1.8 TO 80 MHz	SMD BLOCK H-MOS/TTL
33	SMO-190	SMD OSC 1.8 TO 50 MHz	SMD BLOCK H-MOS/TTL 3.3VOLT
34	MMC-170	SMD Crystals 10-100 MHz	SMD BLOCK low profile

SPECIAL FUNCTION

35	TCXO1809	TCXO 10 TO 24 MHz	14PIN DIL 1.0, 1.5& 2.5 PPM
36	C3303/EXO3	C-MOS PROGRAMMABLE	8 PIN DIP



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Frequency Ageing Characteristics

The frequency ageing characteristics of a crystal is governed by the mode of vibration used, crystal blank thickness, size, and surface finish, electrode material, mounting method, sealing method, cleanliness during manufacture, heat treatment conditions, and many other factors. Moreover, the frequency ageing characteristics is also affected by the crystal usage conditions. For example,

since high temperature operation accelerates ageing, this must be taken into consideration also.

For flexure, extensional, face shear mode the effect of the excitation level is large. Therefore the lowest level must be used. Fig 1 shows the typical frequency ageing characteristics of crystal units.

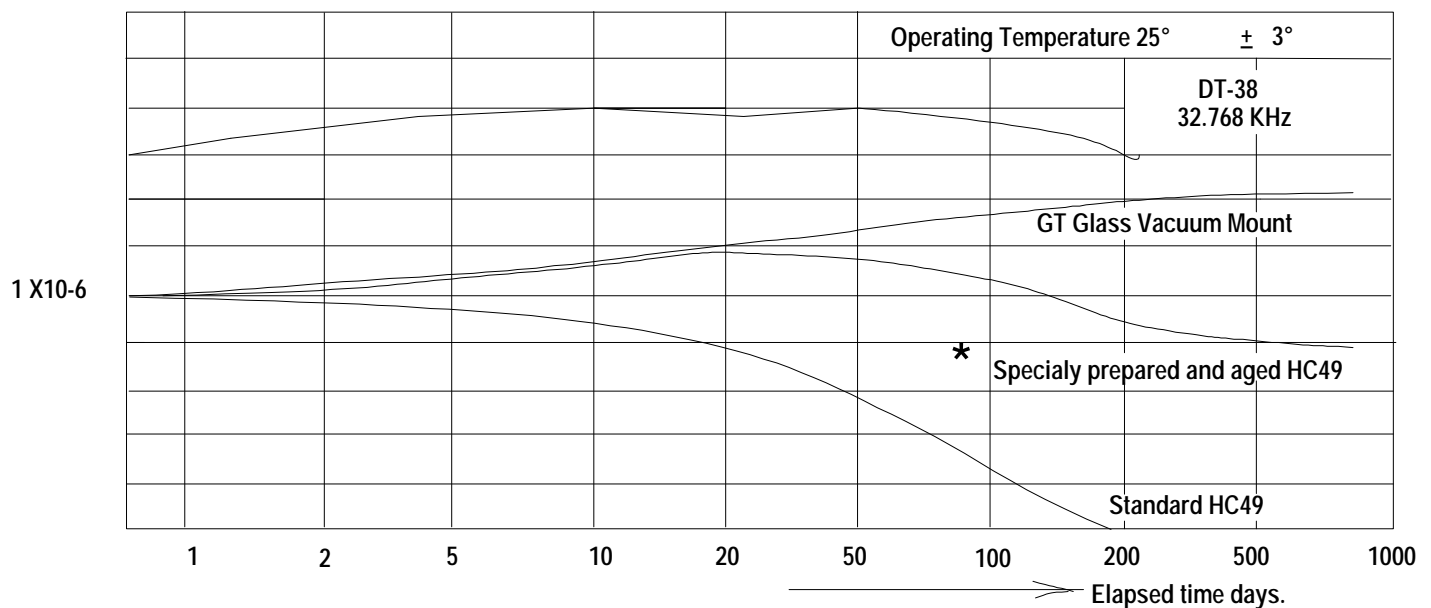


Fig 1 Typical Frequency Ageing Characteristics Worst case

* Bright Star Crystals Custom Unit.



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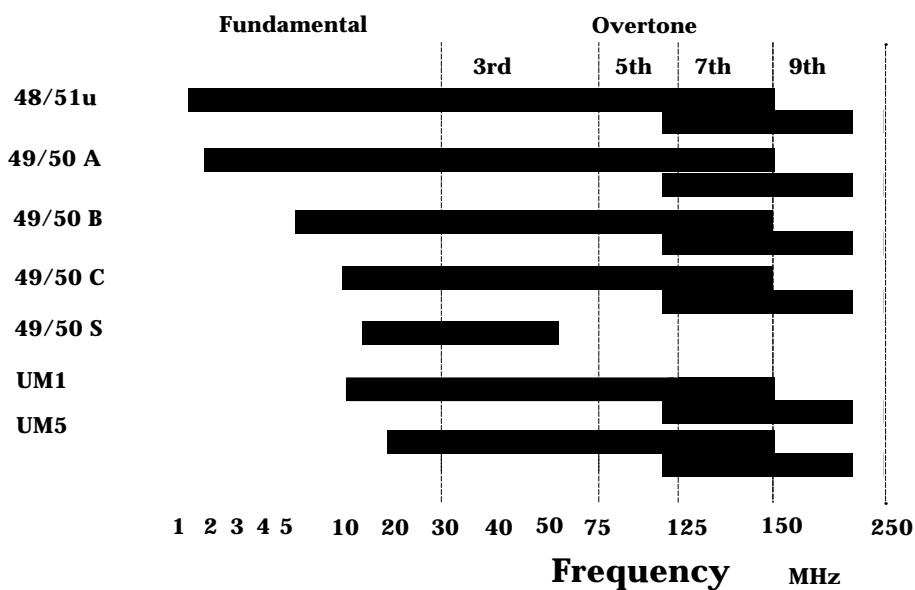
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Frequency Range for Custom Crystals

Referenced to holder type.



REQUIRED CUSTOMER CRYSTAL ORDER SPECIFICATIONS

- 1) FREQUENCY IN MHz (MINIMUM NUMBER OF DECIMAL POINTS (6) *
- 2) HOLDER TYPE (SEE STANDARD HOLDER SHEET) *
- 3) LOAD CAPACITANCE *
- 4) CALIBRATION TOLERANCE AT 25 C *
- 5) FREQUENCY TOLERANCE OVER THE TEMPERATURE RANGE
- 6) OPERATING TEMPERATURE RANGE
- 7) MAXIMUM SERIES RESISTANCE
- 8) SHUNT CAPACITANCE

* MINIMUM REQUIREMENT

* Crystals ordered without minimum requirement will be supplied

- (1) Fundamental ± 10 ppm, 30pf HC49U 2-25 MHz
- (2) Overtone 3rd 10ppm, series mode HC49U 25-60 MHz
- (3) Overtone 5th 10ppm, series mode HC49U 60-125 MHz



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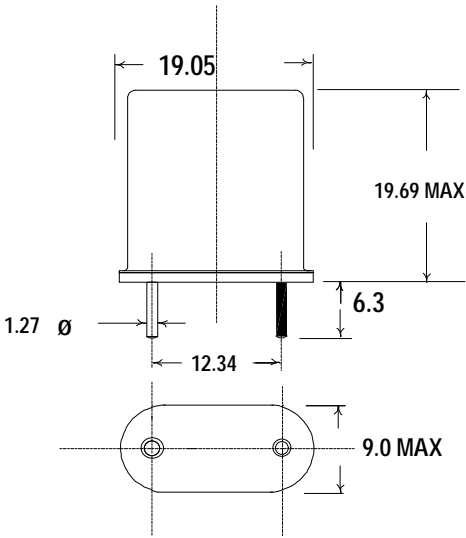
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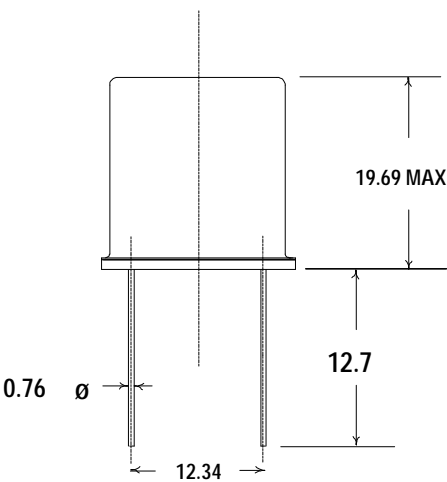
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Standard Holder Types.

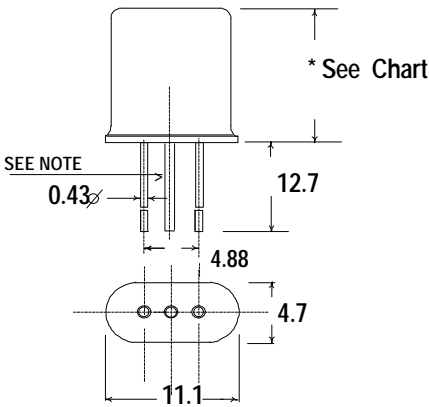
HC 48/U



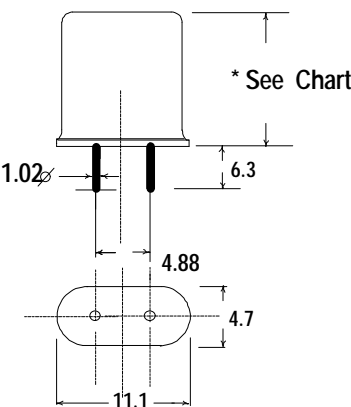
HC 51/U



HC/49*



HC/50*

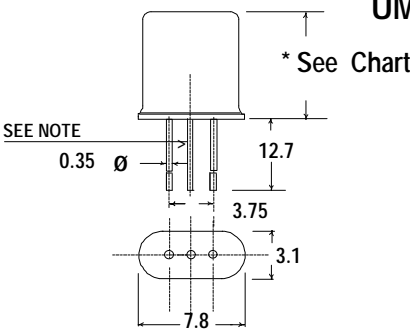


HC49/50

* Height
A= 13.4 max
B= 10.7 max
C= 9.6 max
S= 5.0 max

Size unit MM

UM* Ultra miniture



* Height
UM1 8.0 max
UM5 5.8 max

NOTE :- THIRD WIRE LEAD
SPECIFY AS I.E. 4M096/HC493L



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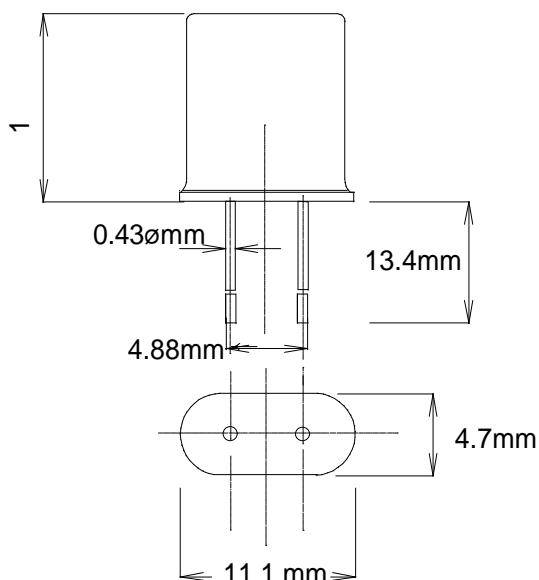
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Standard Crystal Unit

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TYPE HC-49U	Frequency Range See Table 1 Or custom >33 MHz Overtone	Stability ±50 -10 to 65°C Or custom	Calibration @ 25 °C ±50 ppm Or custom
	Mode of Vibration Fundamental	Load Capacitance See Table CL Or custom	Series Resistance See Table R1
	Drive Level 100-500uW	Ageing <5ppm/year	Operation Temp.Range -20 to +70°C Or custom

HOLDER TYPE -Resistance Weld



Frequency (MHz)	R1 Ohm	CL pF
1.000	3000	20
1.8432	700	16
2.000	500	30
2.500	400	20
2.4576	400	16
3.000	200	16
3.1872	200	20
3.072	200	20
3.2768	180	12.5
3.579545	160	18
3.6864	160	20
3.9936	100	30
4.000	100	30
4.032	100	18
4.096	100	20
4.194304	100	12.5
4.433619	80	16
4.608	80	20
4.9152	80	20
5.000	70	30
6.000	50	30
6.1440	50	20
7.3728	40	20
7.680	40	20
8.064	35	18
8.000	35	20
8.192	35	18
8.867238	35	20
9.8304	35	20
10.000	30	30
10.240	30	20
10.245	30	20
11.000	30	20
11.0592	30	30
12.000	30	20
12.288	30	30
14.31818	25	30
14.7456	25	30
15.360	25	20
16.000	25	20
17.000	25	30
18.000	25	20
19.6608	25	18
20.000	25	20
25.000	25	30
40.000 3rd overtone	40	20

Marking 5 digits only



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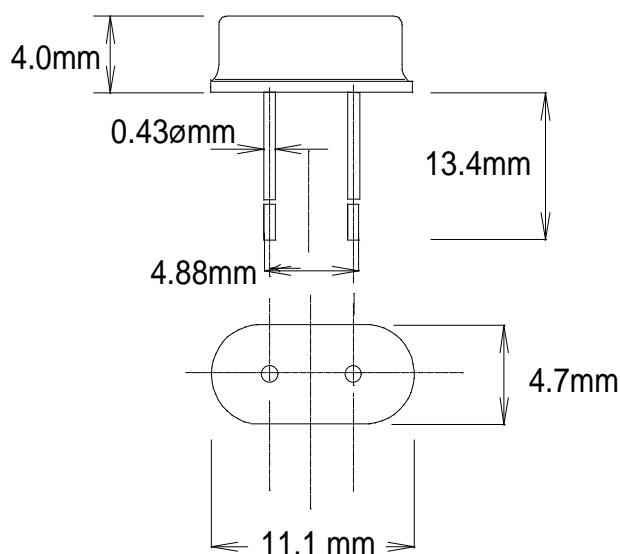
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Standard Crystal Unit

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TYPE HC-49S	Frequency Range See Table 1 Or custom	Stability ±50 -10 to 60°C Or custom	Calibration @ 25 °C ±50 ppm Or custom
	Mode of Vibration Fundamental	Load Capacitance See Table CL Or custom	Series Resistance See Table R1
	Drive Level 100-500uW	Ageing <5ppm/year	Operation Temp.Range -20 to +70°C Or custom -40 to 80°C

HOLDER TYPE -Resistance Weld



Frequency (MHz)	R1 Ohm	CL pF
3.579545	170	16
3.6864	170	16
3.9936	150	16
4.000	150	16
4.032	150	16
4.096	150	16
4.194304	150	16
4.433619	150	16
4.9152	150	16
5.000	120	16
6.000	120	16
6.1440	120	16
7.1509	100	16
7.3728	100	16
8.000	90	16
8.192	90	16
9.8304	90	16
10.000	70	16
10.240	70	16
10.245	70	16
11.0592	70	16
12.000	70	16
12.288	70	16
12.960	70	16
14.31818	70	16
14.7456	70	16
15.000	70	16
15.360	50	16
16.000	50	16
16.384	50	16
18.432	50	16
19.6608	50	16
20.000	40	16
22.1184	40	16
24.00014	40	16
Min order 100 32.000	25	16

Marking 5 digits only



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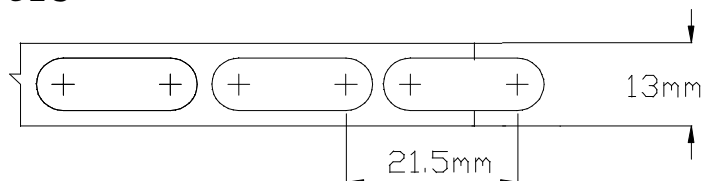
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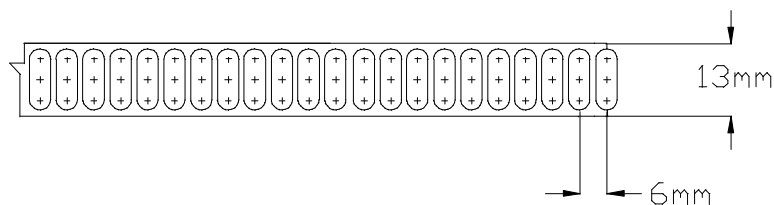
WASHERS

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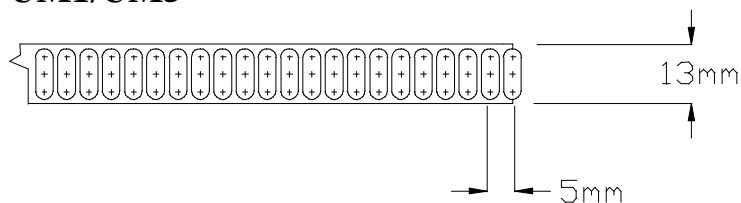
51U



49U



UM1/UM5



Material .15mm Milar



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Specifications.

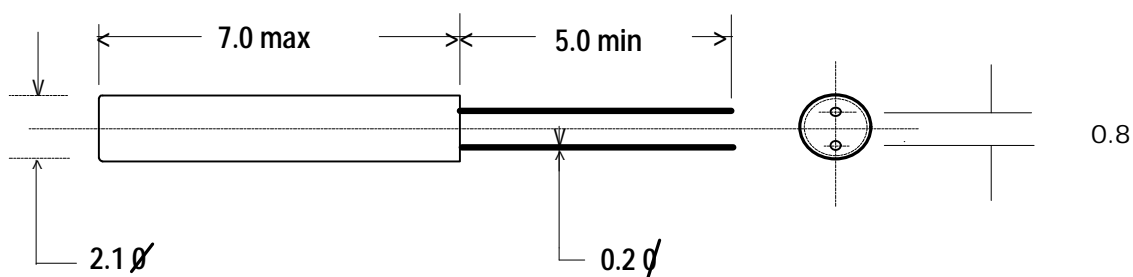
Frequency 32.768 KHz

CL 12.5 pf or 6pf

Frequency tolerance ± 20 ppm @ 27°C

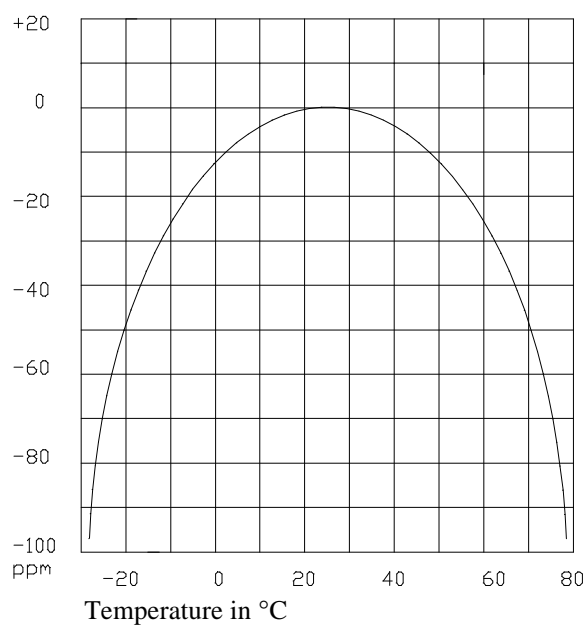
Series Resistance 40K Ω

Type DT26



SIZE IN mm

Frequency Vs Temperature ppm. Typical





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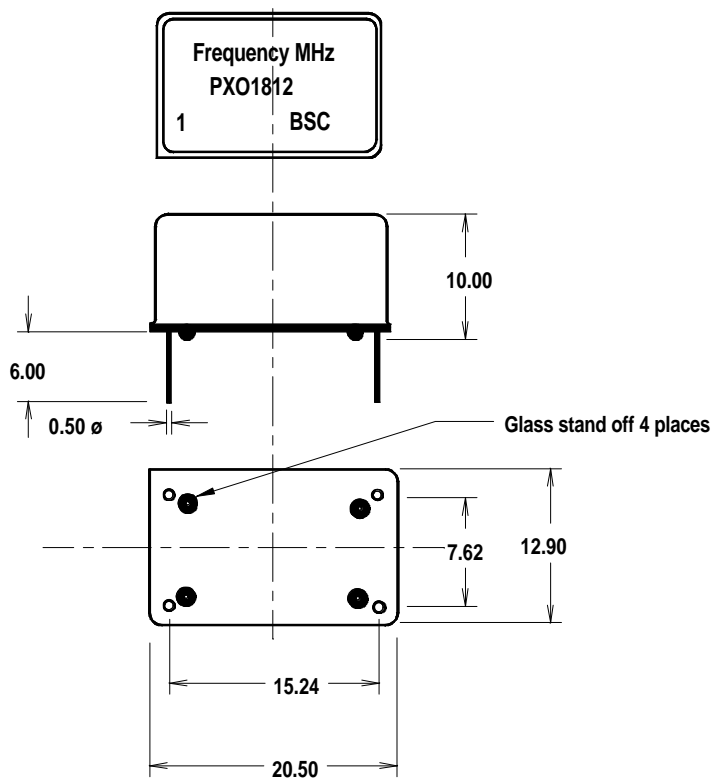
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Packaged Crystal Oscillator

TYPE PXO-1812	Frequency Range	Stability	Calibration @ 25 °C
	33 to 160 MHz	±50 -10 to 65°C	±100 ppm
			Ageing <3ppm/year
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% ±10%	10 TTL+15 pf
	VoL 10% VDD max		or 50PF Cmos
	OUTPUT	Rise / Fall	Supply
	H-MOS	TR/TF< 8 nS	+5 Volt ±5% 50mA max(160MHz)



Pin Connections

- 1 E/D
- 7 Ground
- 8 Output
- 14 +5 Volt

OPTIONS

Adjustment 50 / 25 ppm



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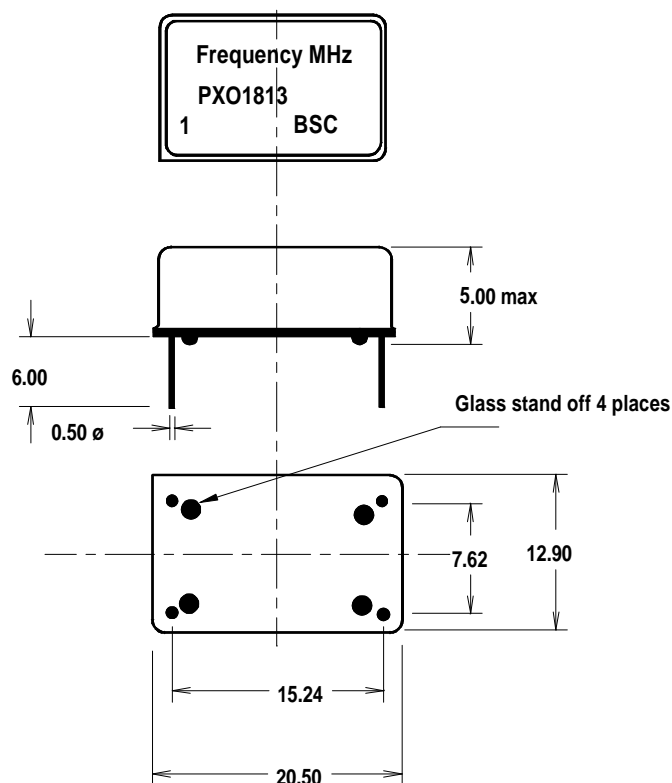
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Packaged Crystal Oscillator

TYPE PXO-1813	Frequency Range	Stability	Calibration @ 25 °C
	.00001 to 160 MHz	+/-50 -10 to 65°C	+/-100 ppm
			Ageing <3ppm/year
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% +/-10%	10 TTL+15 pf
	VoL 10% VDD max		or 50PF Cmos
	OUTPUT	Rise / Fall	Supply
	Tri-state	TR/TF< 5 nS	+5 Volt +/-5% 50mA max(160MHz)



Pin Connections

- 1 E/D
- 7 Ground
- 8 Output
- 14 +5 Volt

OPTIONS

Adjustment 50 / 25 ppm



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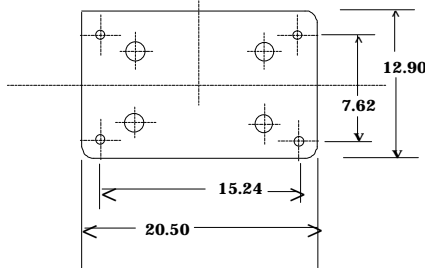
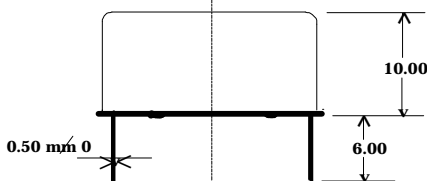
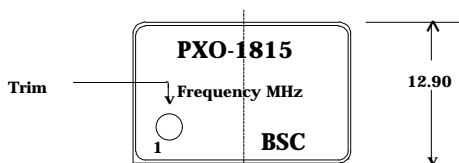
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PACKAGED CRYSTAL OSCILLATORS

TYPE No	FREQUENCY RANGE MHz	TEMPERATURE STABILITY (PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
PXO-1815	1.8 TO 200	± 5 PPM - 20 + 70 C ⁰	Through Hole + 15ppm	C-MOS Compatible Rise time 5ns Max	+ 5v 15 mA Max

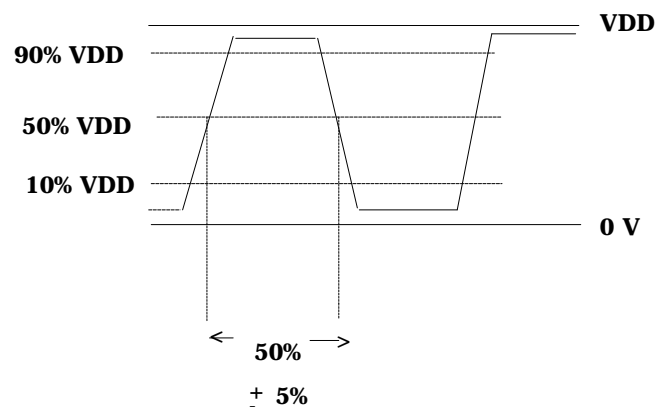
For frequencies above 33 MHz this unit uses PLL technology.



PIN CONNECTIONS

1 NC or E/D
7 GROUND
8 OUTPUT
14 +5 VOLT
SIZE IN MM

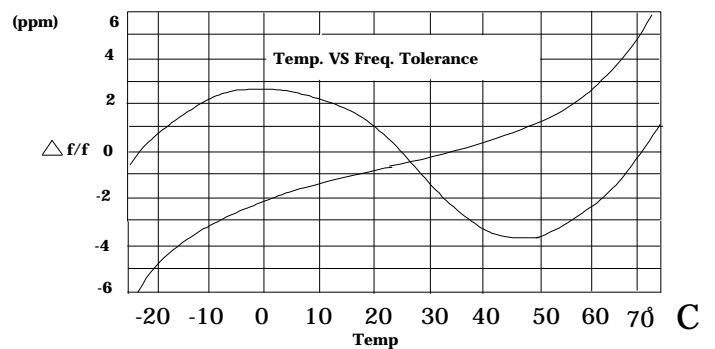
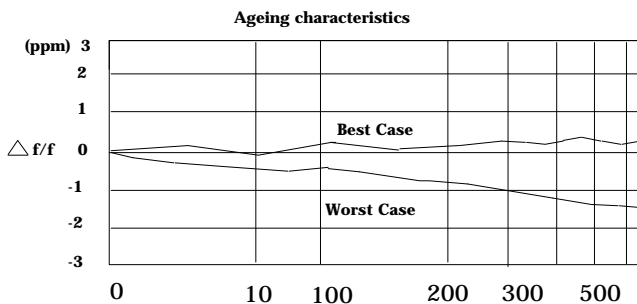
OUTPUT



Options

.0001 KHz to 1.8 MHz

To Special Order





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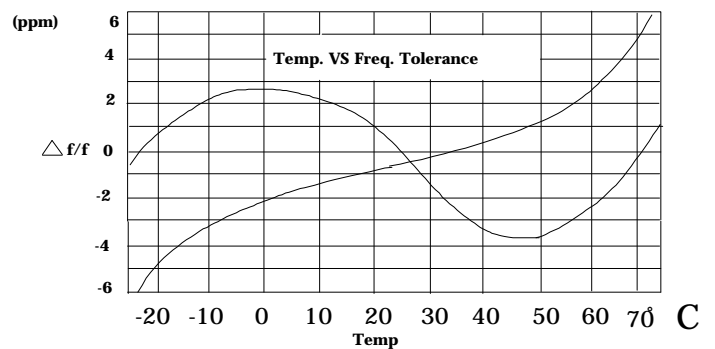
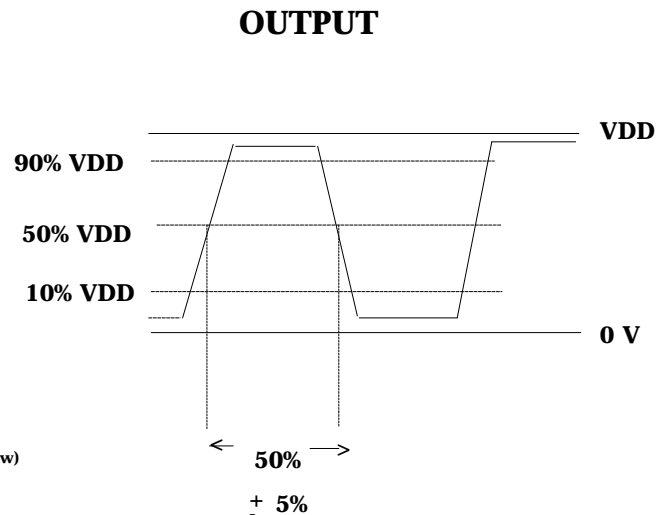
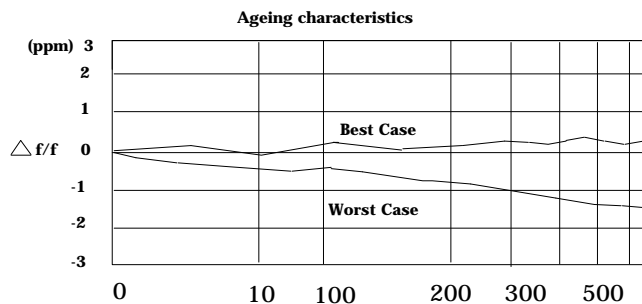
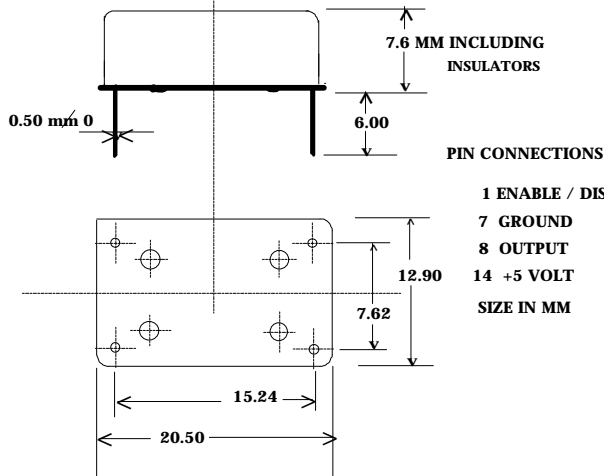
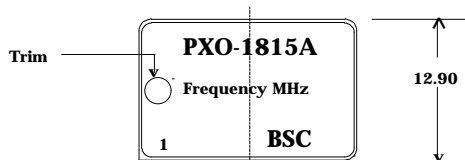
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PACKAGED CRYSTAL OSCILLATORS

TYPE No	FREQUENCY RANGE MHz	TEMPERATURE STABILITY (PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
PXO-1815A	.1 TO 160	± 5 PPM - 20 + 70 C °	Trimmer ± 15 ppm	H-MOS Tri State Rise time 8ns Max	+3 15 mA Max





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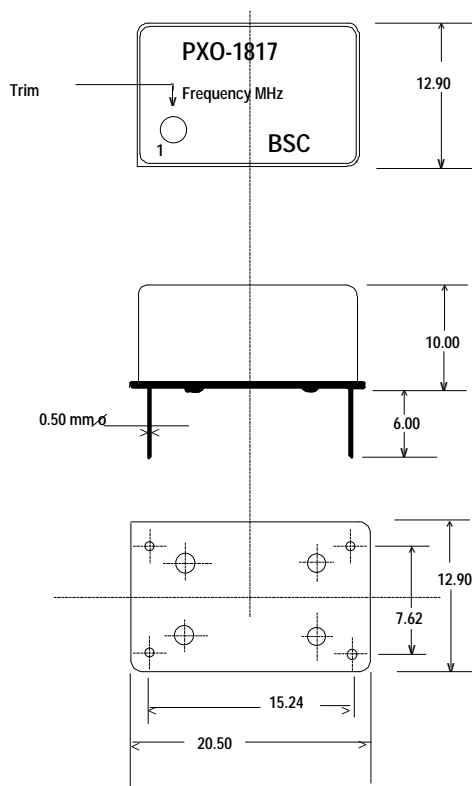
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PACKAGED CRYSTAL OSCILLATORS

Special Low Frequency Unit

TYPE No	FREQUENCY RANGE	TEMPERATURE STABILITY (PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
PXO-1817	32.768 KHz	± 3 Selected Band Run $-5^{\circ} + 60^{\circ} \text{C}$	INTERNAL	LOW POWER C-MOS	+ 5v 3.0 ma Max

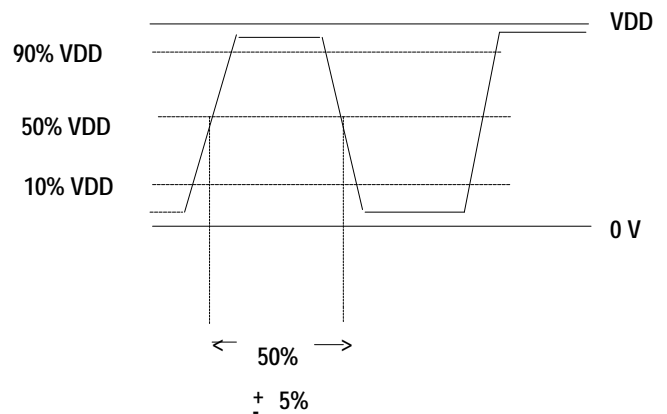


SIZE IN MM

PIN CONNECTIONS

- 1 OUTPUT 4M194304 FOR CALIBRATION
- 7 GROUND
- 8 Output 32K768
- 14 +5 VOLT

OUTPUT



Application

High accuracy, low power,
Real Time Computer Clock,



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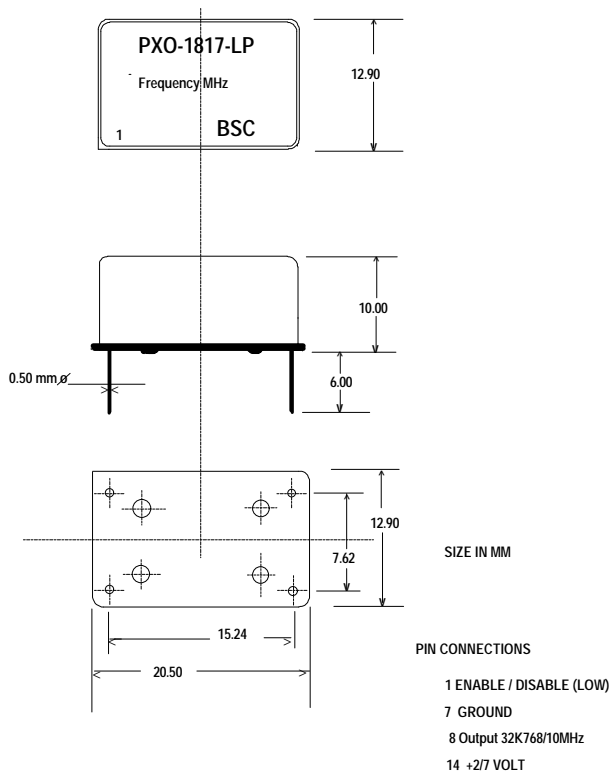
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PACKAGED CRYSTAL OSCILLATORS

Special Low Frequency Unit, Very low power

TYPE No	FREQUENCY RANGE	TEMPERATURE STABILITY (PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
PXO-1817-LP	33.768 KHz 38K000 40.000 KHz 100.00KHz 1-10MHz	SEE CHART 2	INTERNAL ± 10 PPM	VERY LOW POWER C-MOS	+ 2v/7v 5uA @ 32k 130 uA @ 1MHz



OUTPUT

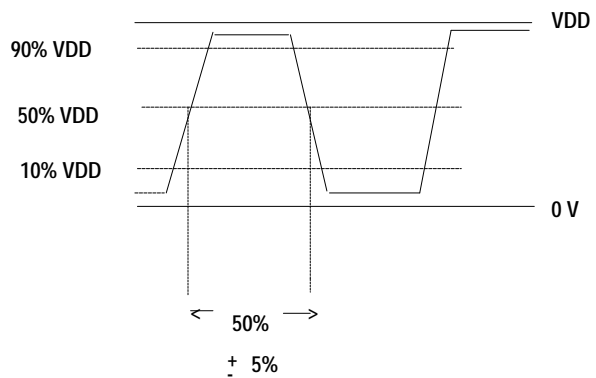
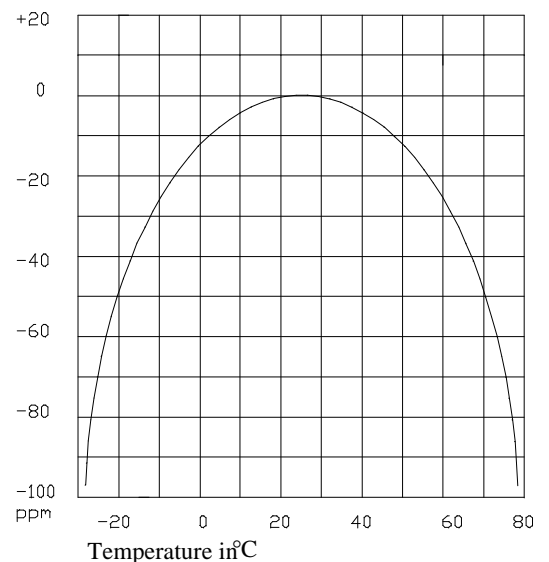


CHART 2

Frequency Vs Temperature ppm. Typical



Application

Real Time Computer Clock,

Options

Through hole trimmer adjustment



ABN No 90 004 849 245

BRIGHT STAR CRYSTALS PTY.LTD.

1/9 HI-TECH PLACE ROWVILLE VIC 3178

PO BOX 335 VERMONT VIC 3133.

PHONE 03 9764 1311 FAX 03 9764 1602

AUSTRALIA (61)

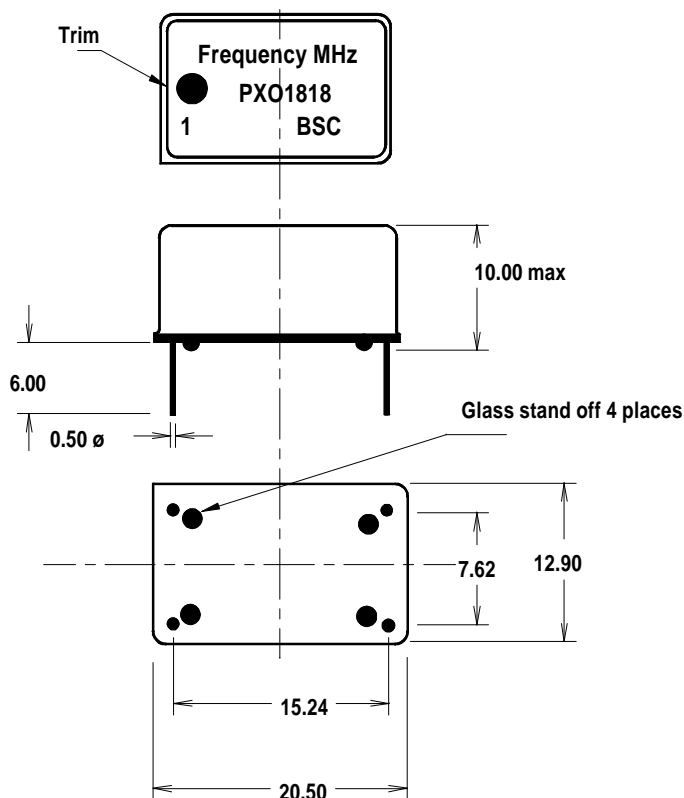
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Packaged Crystal Oscillator

TYPE PXO-1818	Frequency Range	Stability	Calibration @ 25 °C
	.005 to 2.00 MHz	+/-5 -5 to 60C	+/-5 ppm (trimmer adjustment) +/-15ppm
			Ageing <3ppm/year
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% ?10%	C-MOS 15 pf
	VoL 10% VDD max		
	OUTPUT	Rise / Fall	Supply
	C-MOS	TR/TF< 5 nS	+5 Volt ?5% 3mA Max

Pin Connections

- 1 NC
- 7 Ground
- 8 Output
- 14 +5 Volt





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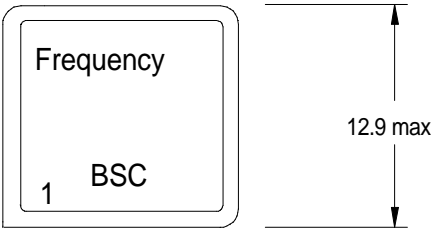
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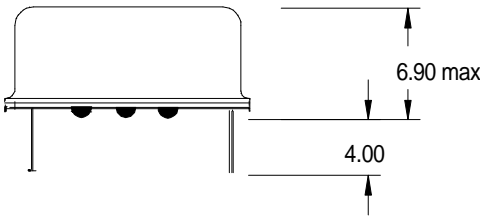
Packaged Crystal Oscillator

TYPE PXO-1819	Frequency Range	Stability	Calibration @ 25 °C
	.00001 to 105 MHz	±50 -10 to 65°C	±100 ppm
			Ageing <3ppm/year
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% ±10%	10 TTL+15 pf
	VoL 10% VDD max		or 50PF Cmos
	OUTPUT	Rise / Fall	Supply
	Tri-state	TR/TF< 5 nS	+5 Volt ±5% 50mA max

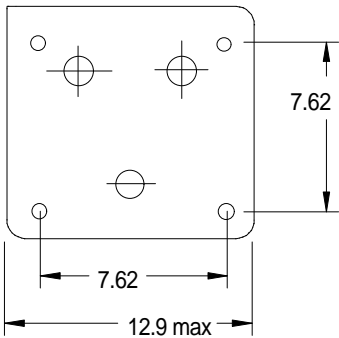


Pin Connections

- 1 E/D
 - 7 Ground
 - 8 Output
 - 14 +5 Volt
- OPTIONS**



Adjustment 50 / 25 ppm





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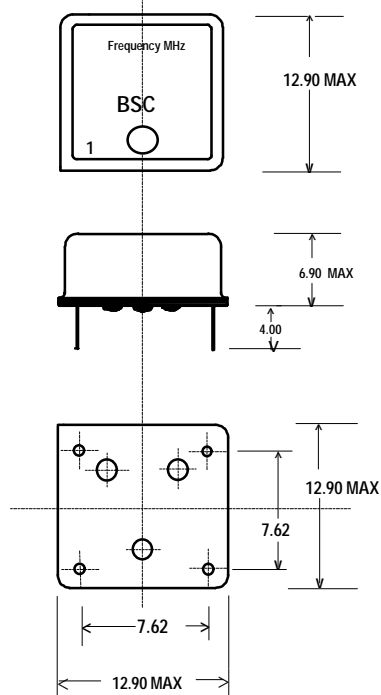
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PACKAGED CRYSTAL OSCILLATORS

8 PIN TYPE HIGH PRECISION

TYPE No	FREQUENCY RANGE MHz	TEMPERATURE STABILITY(PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
PXO-1822	1.8-32	± 5 PPM -10 +65 ° C	ADJUSTABLE < ± 5 PPM	HMOS, C-MOS COMPATIBLE	+ 5v +- .5V



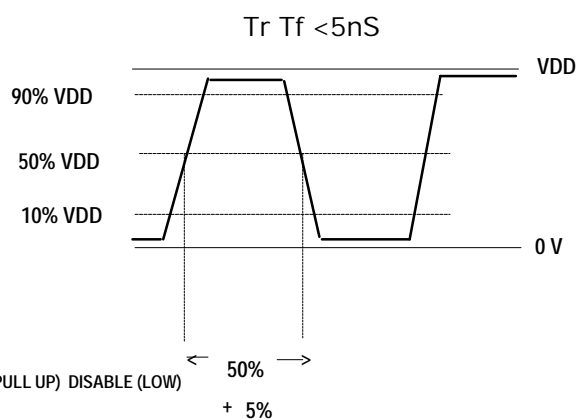
PIN CONNECTIONS

1 ENABLE (INTERNAL PULL UP) DISABLE (LOW)
4 GROUND
5 OUTPUT
8 +5 VOLT
SIZE IN MM

OUTPUT DRIVE

1.8 to 32 MHz - 10TTL/CMOS =50pf

OUTPUT





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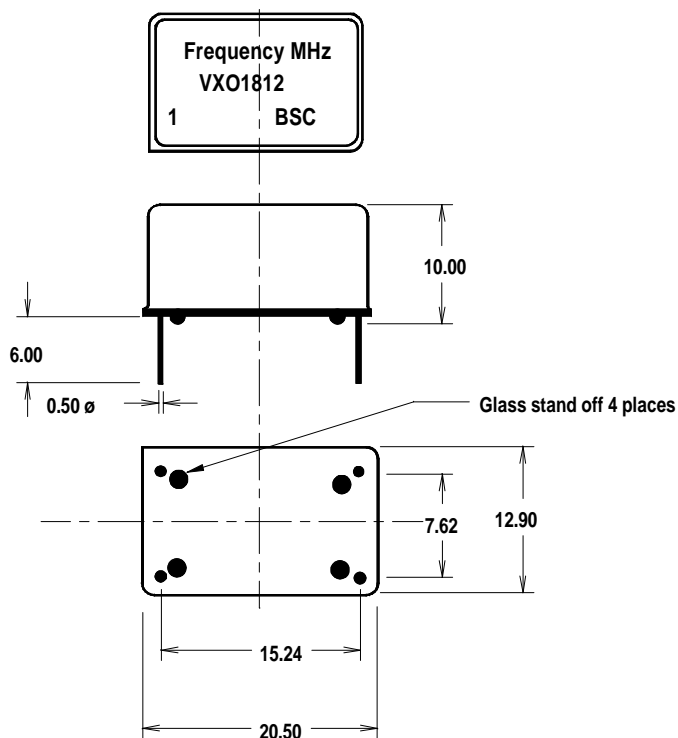
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Voltage Controlled Crystal Oscillator

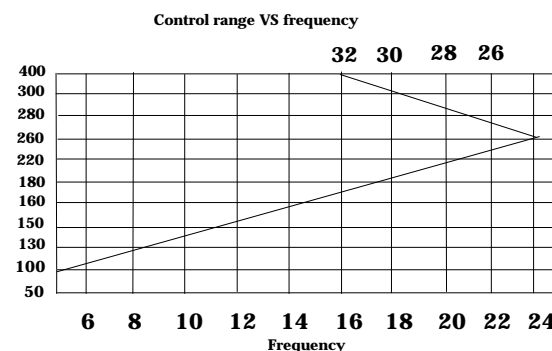
TYPE			Stability	Calibration @ 25 C & 2.5V CV
	VXO-1812 Frequency Range 1 to 33 MHz	With Temp	+/-10 -10 to 65°C	+/-15 ppm
		Ageing	Ageing <3ppm/year	*Option 5ppm (package height 10mm)
		Supply	+/-3ppm/5V+/-10%	*Ageing <2ppm/year
		Output Level	Output Symmetry	Output load
		VoH+90% VDD min	50% +/-10%	10 TTL+15 pf
		VoL 10% VDD max		or 50PF Cmos
		SLOPE Positive	Pulling range CV	2.5V +/-2V see chart
		Linearity	Rise / Fall	Supply
		+/-10%	TR/TF< 8 nS	+5 Volt +/-5% 50mA max

Pin Connections

- 1 Control Voltage
- 7 Ground
- 8 Output
- 14 +5 Volt



Pulling Range Chart



OPTIONS

3.3V

8 Pin type VXO-1819



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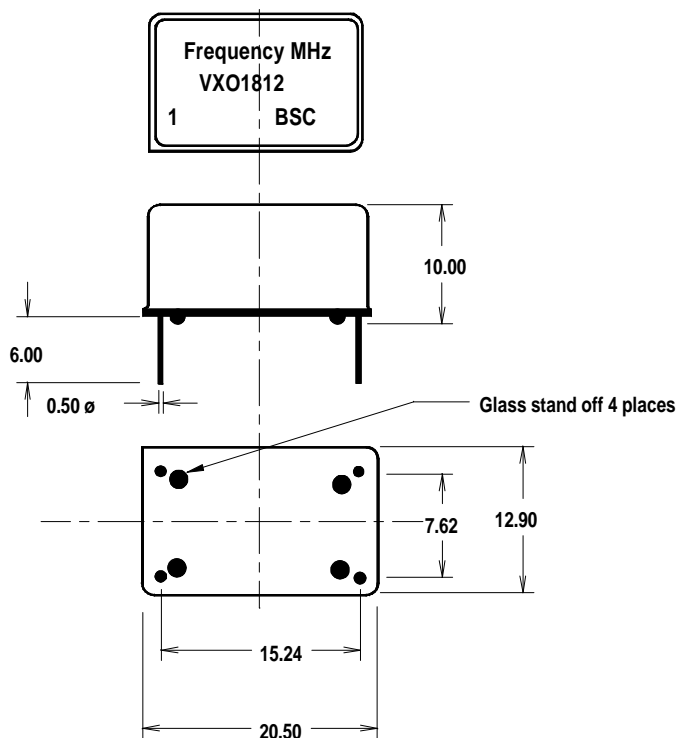
[Click to return to index](#)

Voltage Controlled Crystal Oscillator

TYPE VXO-1812 Frequency Range 30 to 160 MHz		Stability	Calibration @ 25 C & 2.5V CV
	With Temp	+/-10 -10 to 65C	+/-15 ppm
	Ageing	Ageing <3ppm/year	*Option 5ppm (package height 10mm)
	Supply	+/-3ppm/+/-V? 10%	*Ageing <2ppm/year
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% +/-10%	10 TTL+15 pf
	VoL 10% VDD max		or 50PF Cmos
	SLOPE Positive	Pulling range CV	2.5V +/-2V see chart
	Linearity	Rise / Fall	Supply
	+/-10%	TR/TF< 8 nS	+5 Volt +/-5% 50mA max

Pin Connections

- 1 Control Voltage
- 7 Ground
- 8 Output
- 14 +5 Volt



OPTIONS

3.3V

8 Pin type VXO-1819



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VCTCXO1800 VCTCXO1800S

FEATURES

Low profile
Excellent stability
Low hysteresis
Low power consumption
Wide voltage control ranges available

VCTCXO CHARACTERISTICS

Frequency Characteristics	
Short term stability	<1.0e-9 AllanVariance Max for 1second Tau
Adjustment range	±3.0ppm min internal manual trimmer
Power Supply	
Voltage	3.0, 3.3, 4.0, 5.0V ±5% customer specified
Current	2.0 mA max

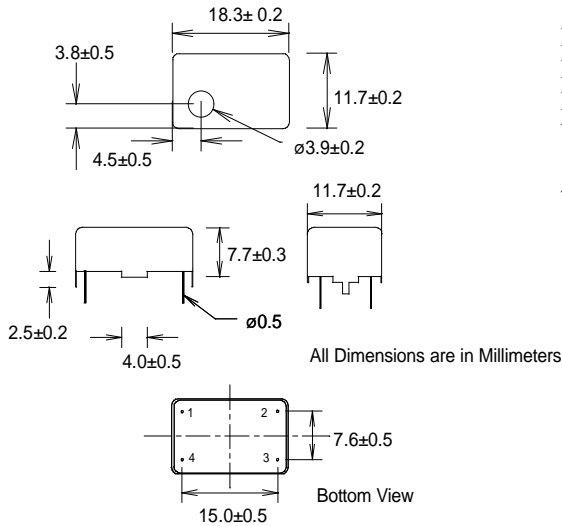
Voltage Control	
Frequency control range	Positive slope ±3.0ppm to ±18ppm (specify)
Mominal control voltage	2.5 V (operating on 5V)
Control voltage range	+.05Vdc to +4.5Vdc (operating on 5V)
Port input impedance	100KΩ Min

Oscillator output	VCTCXO1800S
-------------------	-------------

Output voltage	1.0Vp-p clipped sinewave	Pure sinewave
External load	20KΩ//5pf DC-Cut	20KΩ//5pf DC-Cut
Harmonics	-5dBc Max	-12dBc Max

SSB Phase Noise (Quiescent)	<12MHz	<17MHz	<25 MHz
-----------------------------	--------	--------	---------

1Hz	-60dBc/Hz	-55dBc/Hz	-50dBc/Hz
10Hz	-90dBc/Hz	-85dBc/Hz	-80dBc/Hz
100Hz	-120dBc/Hz	-115dBc/Hz	-110dBc/Hz
1Kz	-140dBc/Hz	-135dBc/Hz	-135dBc/Hz
10Kz	-145dBc/Hz	-145dBc/Hz	-145dBc/Hz
100Kz	-150dBc/Hz	-150dBc/Hz	-150dBc/Hz





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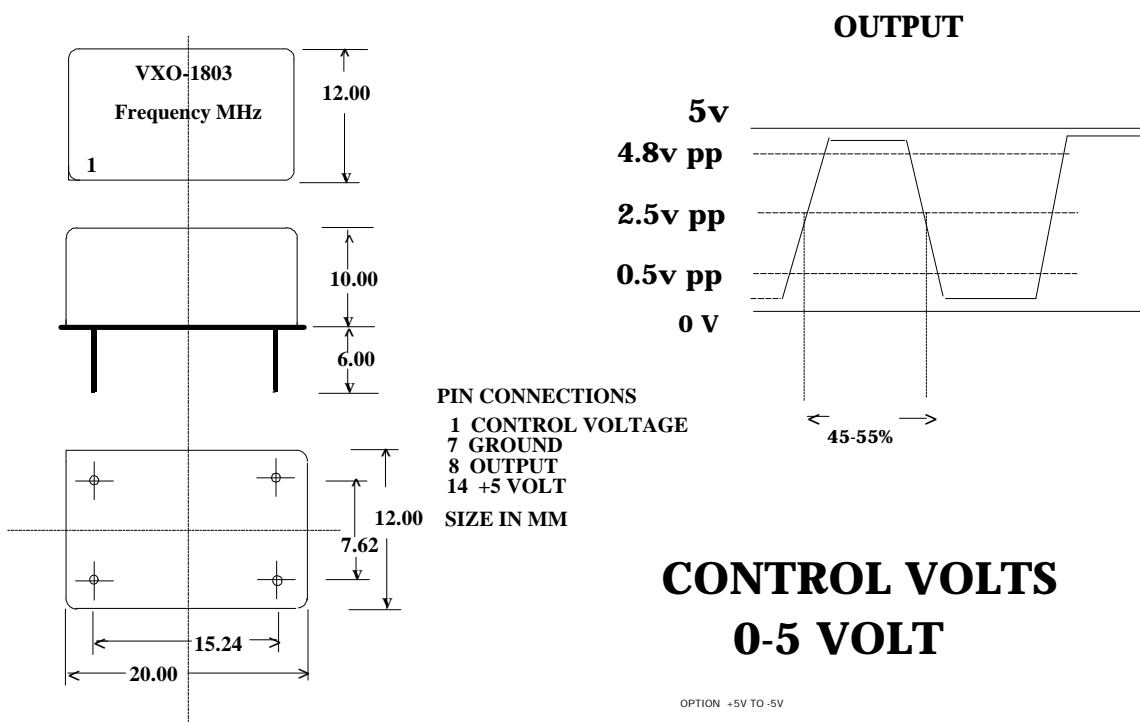
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PACKAGED CRYSTAL OSCILLATORS

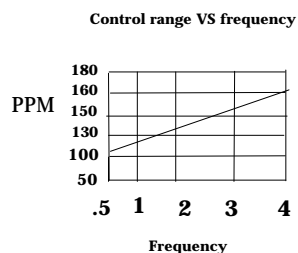
VOLTAGE CONTROLLED CRYSTAL OSCILLATORS

TYPE No	FREQUENCY RANGE MHz	TEMPERATURE STABILITY(PPM)	TRIM TYPE	OUTPUT TYPE	SUPPLY
VXO-1803	500Hz -5 MHz	± 15 PPM $-10^{+70} \text{ C}^{\circ}$	CONTROL RANGE $+ 100\text{PPM min}$	H-MOS	$+ 5\text{v}$



Nominal frequency set with the centre frequency in the centre of the control range $\pm 15\text{ppm}$

The chart shows the change in frequency in ppm for a change in control volts of 2.5v + or -



Note can be supplied with trimmer access for centre frequency setting and would be preset to $\pm 5\text{ppm}$ or better.



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VOLTAGE CONTROLLED OSCILLATORS

25-1025 MHz

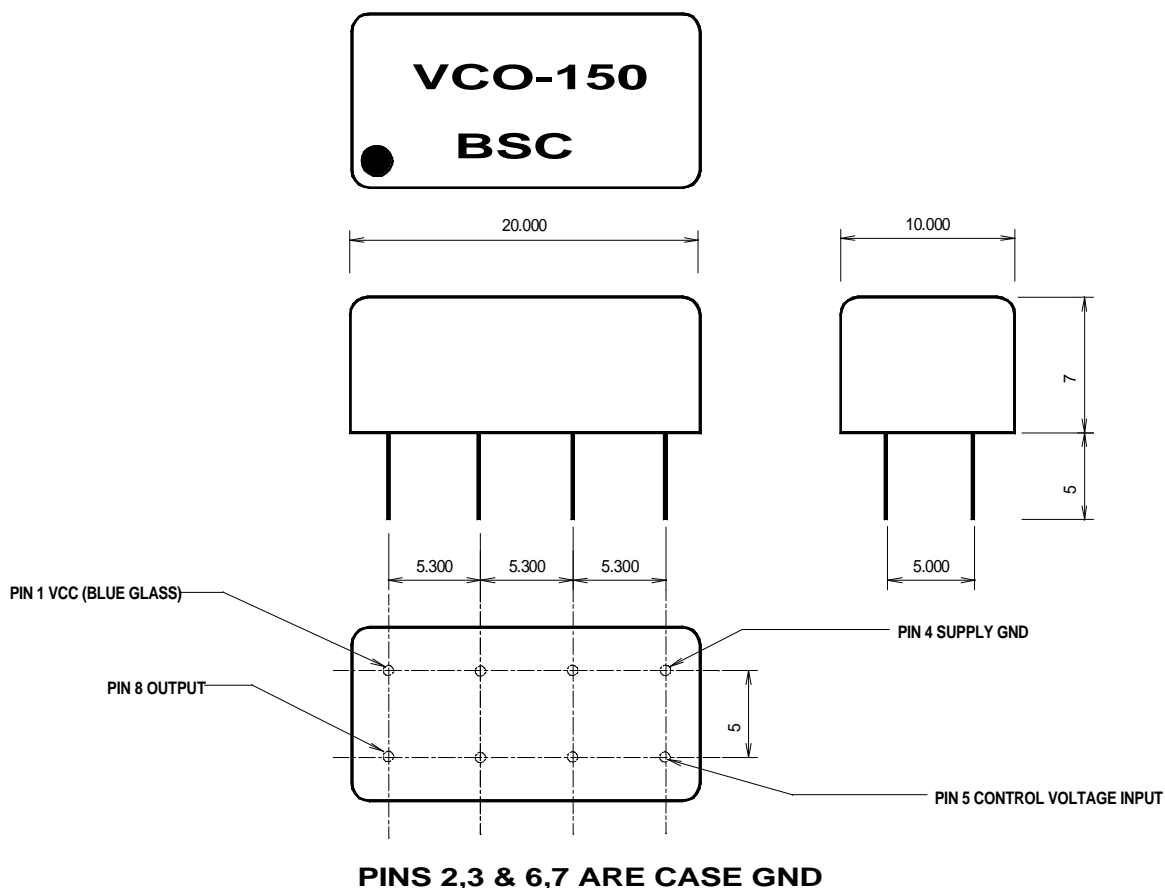
10 Overlapping frequency range units.

MODEL No	FREQ RANGE MHz	PHASE NOISE (dBc/Hz) SSB@ 10KHz TYP	HARMONICS (dBc) TYPICAL	POWER 12V DC CURRENT mA
POS-50	25-50	-110	-19	17
POS-75	37.5-75	-110	-27	17
POS-100	50-100	-107	-23	18
POS-150	75-150	-103	-23	18
POS-200	100-200	-102	-24	18
POS-300	150-280	-100	-30	18
POS-400	200-380	-98	-28	18
POS-535	300-525	-93	-26	18
POS-765	485-765	-85	-21	22
POS-1025	685-1025	-84	-23	22

OUTPUT +7dBm DRIVES UP TO 7 MIXERS

Note: tuning voltage 1-16 volts required to cover frequency range.

Operating temperature range -55°C to +85°C





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Voltage Controlled Crystal Oscillator

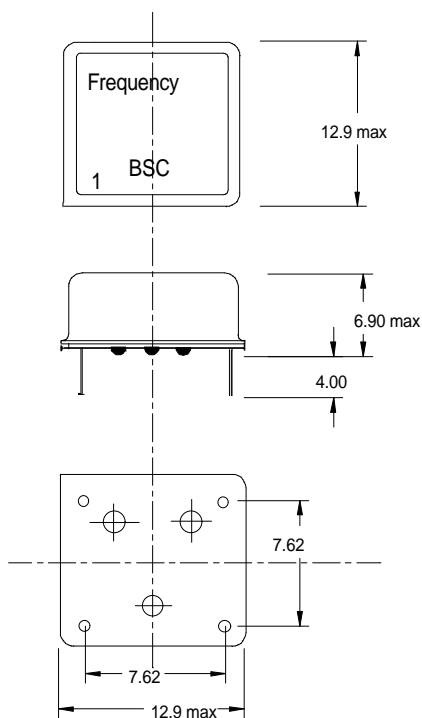
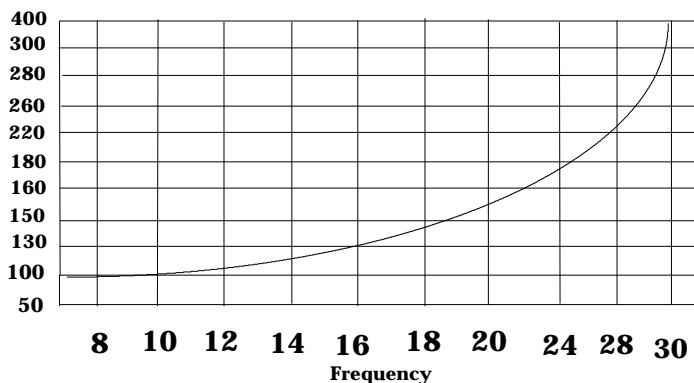
TYPE VXO-1819 Frequency Range 4 to 33 MHz OPTION 3.3 volt		Stability	Calibration @ 25 °C & 2.5V CV
	With	Temp	± 10 -10 to 65°C
		Ageing	Ageing <3ppm/year
		Supply	± 3 ppm/5V $\pm 10\%$
	Output Level	Output Symmetry	Output load
	VoH+90% VDD min	50% $\pm 10\%$	10 TTL+15 pf
	VoL 10% VDD max		or 50PF Cmos
	SLOPE Positive	Pulling range CV	2.5V ± 2V see chart
	Linearity	Rise / Fall	Supply
	$\pm 10\%$	TR/TF < 8 nS	+5 Volt $\pm 5\%$ 50mA max

Pin Connections

- 1 Control Voltage
- 7 Ground
- 8 Output
- 14 +5 Volt

Pulling Range Chart

Control range VS frequency





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CM309

SURFACE MOUNT

■ Features and Applications

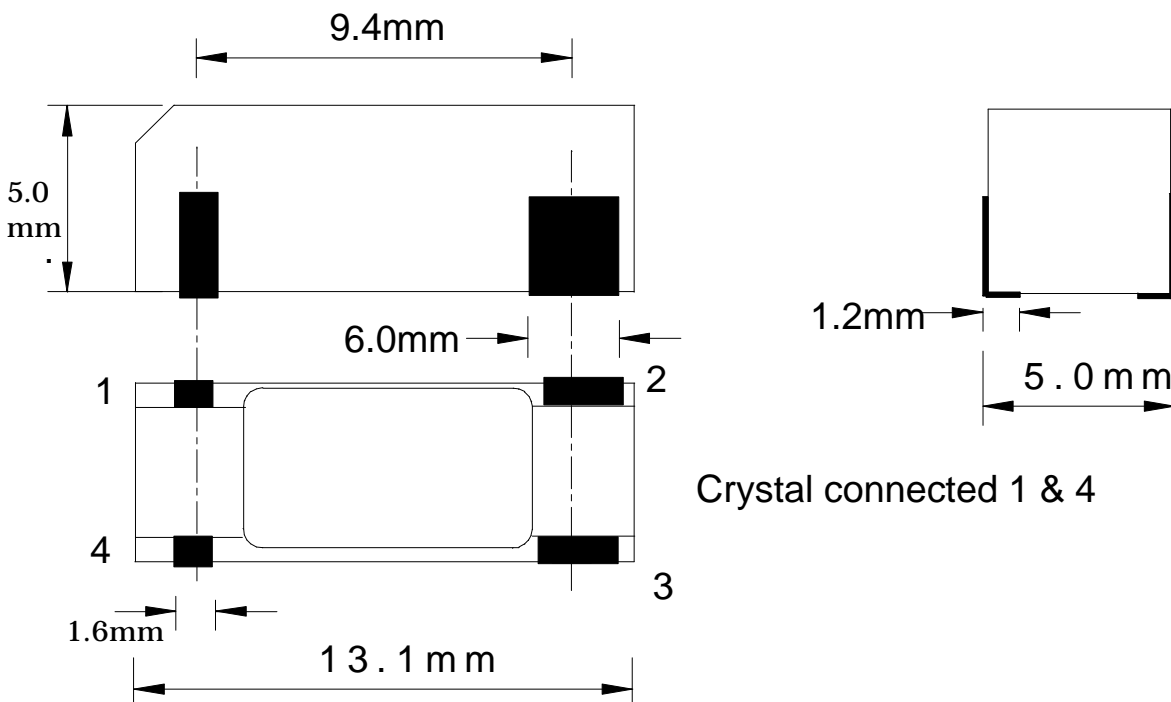
The chip type crystal unit CM309 package designed for surface mounting. The double construction assures high reliability under reflow soldering.

■ Standard Specifications

- | | |
|---------------------------------|------------------------------|
| 1. Holder type | CM309 |
| 2. Frequency Range | 3. 579545 to 30.000 MHz |
| 3. Calibration tolerance | ±50PPM AT +25C |
| 4. Temperature Stability | 50ppm -30C to +80C |
| 5. Drive level | 100uW max |
| 6. Cut | AT- Cut |
| 7. Load Capacitance | 16pF |
| 8. Equivalent series resistance | Refer table 1 |
| 9. Shunt capacitance | 7pF Max |
| 10. Reflow condition | 260C , 10sec Max |
| 11. Marking | CM Frequency-code, Date-code |

TABLE 1

Frequency (MHz)	R1 ohm
3.579545 MHz	170
3.686400 MHz	170
3.993600 MHz	170
4.000000 MHz	150
4.032000 MHz	150
4.096000 MHz	150
4.194304 MHz	150
4.433619 MHz	150
4.915200 MHz	150
5.000000 MHz	150
5.068800 MHz	150
6.000000 MHz	120
6.144000 MHz	120
7.372800 MHz	100
8.000000 MHz	90
8.192000 MHz	90
9.830400 MHz	90
10.000000 MHz	70
11.05920 MHz	70
12.000000 MHz	70
12.28800 MHz	70
14.31818 MHz	70
14.74560 MHz	70
15.00000 MHz	70
16.00000 MHz	50
16.38400 MHz	50
18.43200 MHz	50
19.66080 MHz	50
20.00000 MHz	40
24.00000 MHz	40
24.57600 MHz	40





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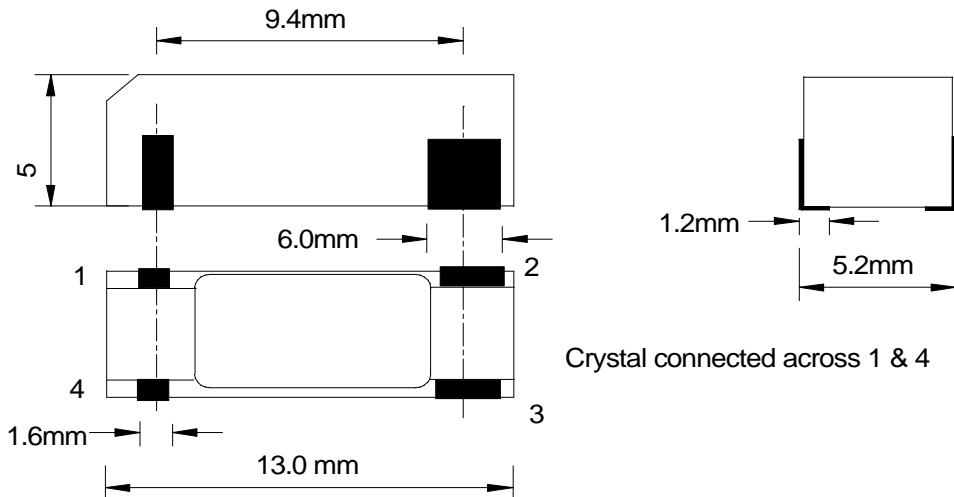
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Standard Crystal Unit

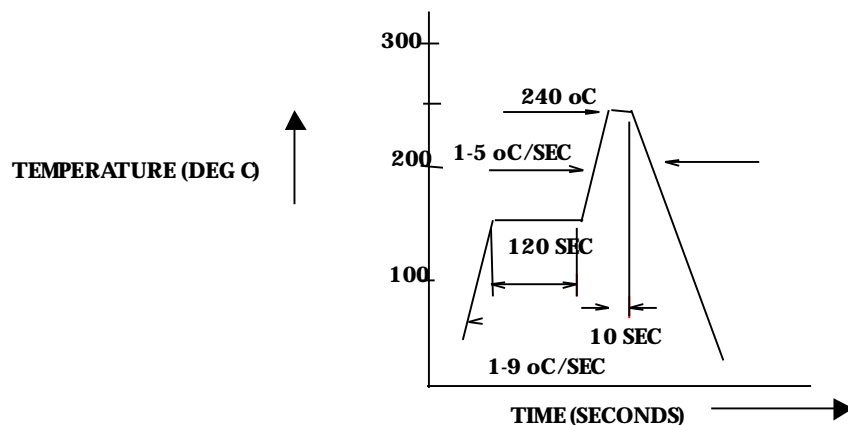
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TYPE HC49US-P	Frequency Range 3.200 to 80.00MHz	Stability +/-50 -10 to 65C	Calibration @ 25 °C +/-50 ppm
	Mode of Vibration 40.0 to 80 MHz Overtone		Series Resistance <60 ohm
	Fundamental 3.2-40.0 MHz	Load Capacitance 10pf to series	Series Resistance 170ohm to 40ohm
	Drive Level 100-500uW	Ageing <5ppm/year	Operation Temp.Range -20 to +70C

Replacement for MG3A / CM309



SOLDERING CONDITIONS (MAX)





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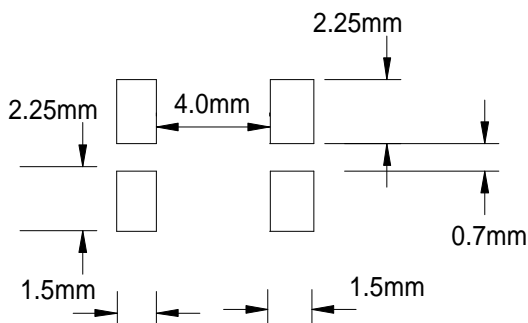
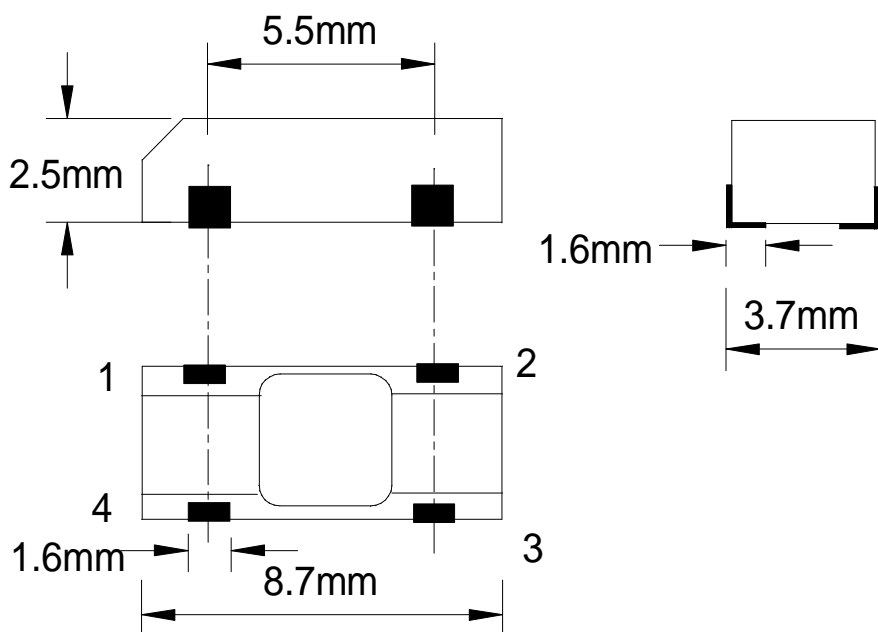
Surface Mount Crystal

TYPE	Frequency	Stability	Calibration @ 25 °C
T2 (A&B)	32.768 KHz	±30 -10 to 65°C	±20 ppm @ CL
	38.400 KHz	Parabolic center @ 27°C	Ageing <5ppm/year
	CL		
	12.5 or 6 pf		

Crystal connections

T2-A across 1 & 4

T2-B 1&4 connected together
2&3 connected together
crystal between(1,4) and (2,3)



PAD LAYOUT



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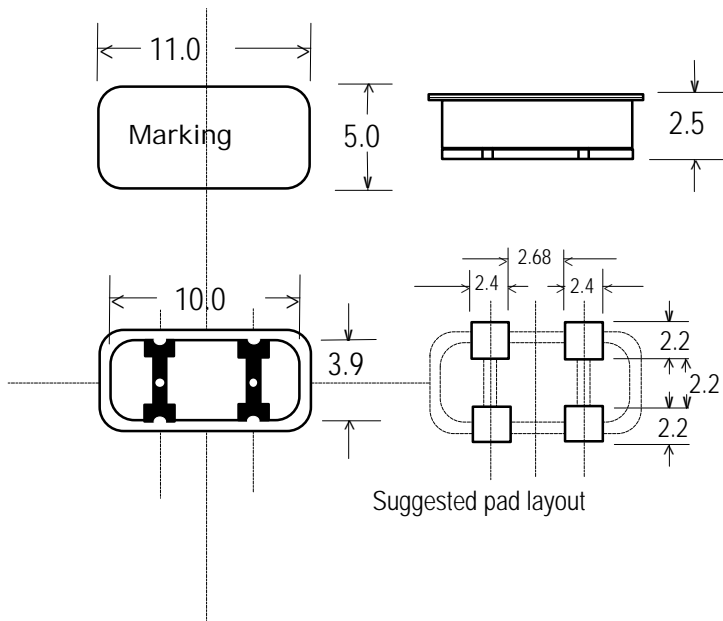
Surface Mount Crystal SX-01

Features

- *Miniture size*
- *Lowest frequency*
- *Resistance weld package*
- *Reflow soldering*

FREQUENCY RANGE	SEE TABLE 1
FREQUENCY TOLERANCE	$\pm 50\text{ppm}$ (@ $25^\circ \pm 3^\circ\text{C}$)
FREQUENCY STABILITY	$\pm 50\text{ppm}$ (Ref. to 25°C)
OPERABLE TEMPERATURE	- 10 + 60°C
EQUIVALENT SERIES RESISTANCE	SEE TABLE 1
LOAD CAPACITANCE	SEE TABLE 1
DRIVE LEVEL	0.1 mW (Typ)

■ Specification



FREQ RANGE	MODE	CL	ESR Max
------------	------	----	---------

3.200 ~ 3.499	FUND	16PF	200Ω
3.500 ~ 3.999	FUND	16PF	140Ω
4.000 ~ 4.299	FUND	16PF	120Ω
4.400 ~ 4.899	FUND	16PF	100Ω
4.900 ~ 5.999	FUND	16PF	80Ω
6.000 ~ 6.999	FUND	16PF	60Ω
7.000 ~ 7.999	FUND	16PF	50Ω
8.000 ~ 10.999	FUND	16PF	45Ω
11.000 ~ 11.999	FUND	16PF	40Ω
12.000 ~ 14.999	FUND	16PF	35Ω
15.000 ~ 36.000	FUND	16PF	30Ω
27.000 ~ 70.000	3rd O/T	Series	100Ω



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SMT49/US

SURFACE MOUNT

GENERAL SPECIFICATIONS

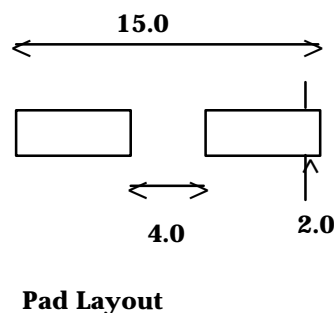
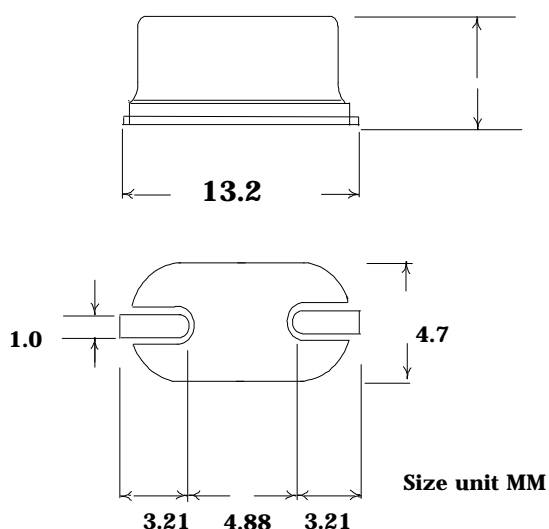
NOMINAL FREQUENCY	Customer specified or table 1
MODE OF VIBRATION	FUNDAMENTAL OT >32 MHz
HOLDER TYPE	SMT49/US
FREQUENCY TOLERANCE	+/-50ppm to 20ppm
LOAD CAPACITANCE	Customer specified CL
SERIES RESISTANCE	SEE TABLE R1
FREQUENCY STABILITY	± 50ppm
OPERATING TEMP. RANGE	-10 to +60 °C
DRIVE LEVEL	500uW (10 MHz MAX.) 50uW (10 MHz MIN.)
AGEING	± 10ppm / YEAR

TABLE 1

Frequency (MHz)	R1 ohm
3.579545 MHz	170
3.686400 MHz	170
3.993600 MHz	170
4.000000 MHz	150
4.096000 MHz	150
4.194304 MHz	150
4.433619 MHz	150
4.915200 MHz	150
5.000000 MHz	150
5.068800 MHz	150
6.000000 MHz	120
6.144000 MHz	120
7.372800 MHz	100
8.000000 MHz	90
8.192000 MHz	90
9.830400 MHz	90
10.000000 MHz	70
11.05920 MHz	70
12.000000 MHz	70
12.28800 MHz	70
12.96000 MHz	70
14.31818 MHz	70
14.74560 MHz	70
15.00000 MHz	70
16.00000 MHz	50
16.38400 MHz	50
18.43200 MHz	50
19.66080 MHz	50
20.00000 MHz	40
24.00000 MHz	40
24.57600 MHz	40

* Marking 5 digits only.

HOLDER TYPE - Resistance Weld





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SURFACE MOUNT OSCILLATORS

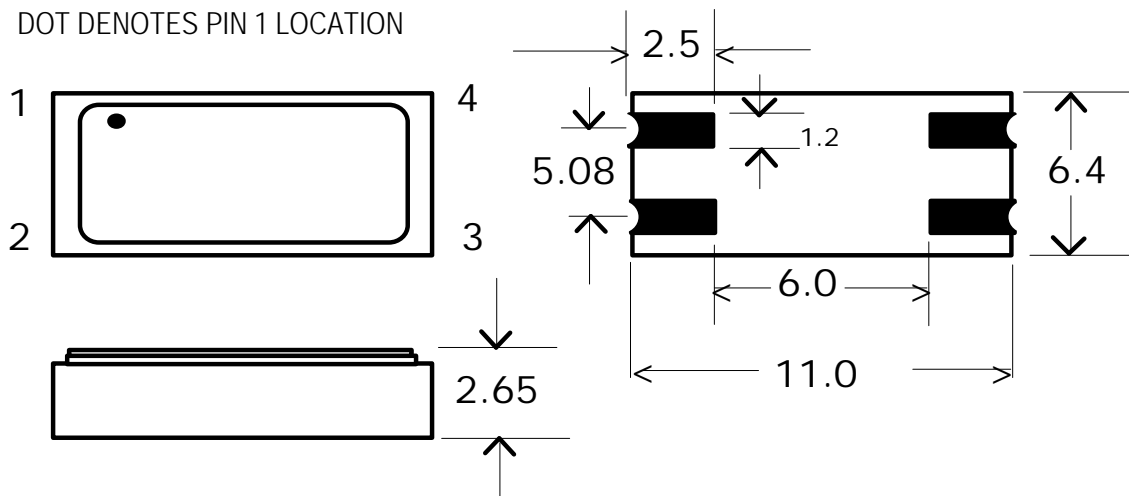
SMO 150-160 / RUN 80-90

NOTE THESE ARE LONG DELIVERY

SMO 150	SMO 160
---------	---------

FREQUENCY	1.8432-70 MHz	1.8432-50 MHz
STABILITY	+/-100PPM	+/- 100PPM
OPERATING TEMP RANGE	-10 +70C	
INPUT VOLTAGE	+5 DC +/-0.5V	
INPUT CURRENT (MAX)	25mA 1.8-25 MHz	20mA 1.8-25 MHz
	45mA 25-50 MHz	35mA 25-50 MHz
	60Ma 50-70 MHz	
SYMMETRY @ 2.5V	40/60%	45/55%
RISE/FALL TIME (0.5-4.5) MAX	7 nS	10 nS
ENABLE INPUT		2.2 V Min @ 0.4mA
DISABLE INPUT		0.8 V Max @ 0.4 mA
OUTPUT LOAD	10 TTL GATES OR 50PF	10 LS-TTL OR 15PF

DOT DENOTES PIN 1 LOCATION





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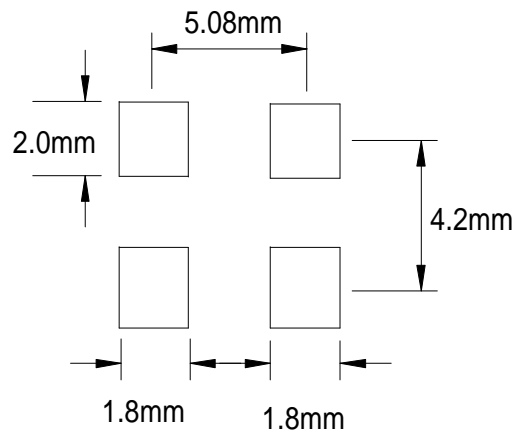
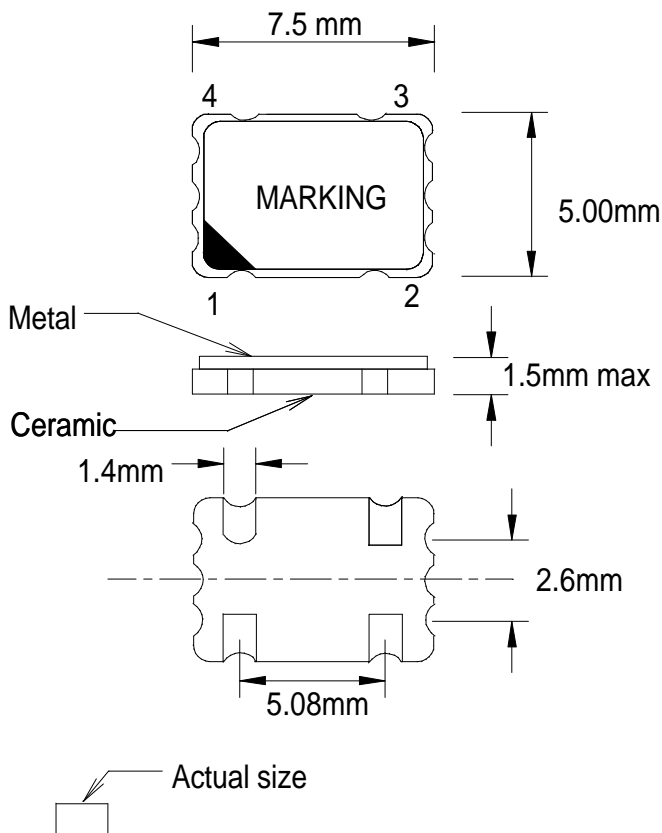
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SURFACE MOUNT OSCILLATORS

SMO 170-180 / MIN80/MIN90 AS-T

	SMO 170	SMO 180
FREQUENCY	1.8 - 50 MHz	1.8 - 80 MHz
STABILITY	+/-100 , 50 or 25 ppm	+/- 100 , 50 or 25ppm
OPERATING TEMP RANGE	-10 +70C	
INPUT VOLTAGE	+5 DC +/-0.5V	
INPUT CURRENT (MAX)	25mA 1.8-32 MHz 35mA 32-50 MHz	27mA 1.8-32 MHz 45mA 32-50 MHz 75Ma 50-80 MHz
SYMMETRY @ 2.5V	45/55%	45/55%
RISE/FALL TIME (0.5-4.5) MAX	10nS	7 nS
ENABLE INPUT		2.2 V Min @ 0.4mA
DISABLE INPUT		0.8 V Max @ 0.4 mA
OUTPUT CURRENT	0=4mA 1=4mA	0=16mA 1=16mA
OUTPUT LOAD	10 TTL GATES OR 15PF CMOS 15PF	10 LS-TTL OR 50PF CMOS 50PF
PIN CONNECTIONS	# 1 E/D # 3 OUTPUT # 2 GND	# 4 +5V DC



SUGGESTED PAD LAYOUT

Order code SMO-1XX-Frequency-XXppm IE. SMO170-33M000-25



ABN No 90 004 849 245

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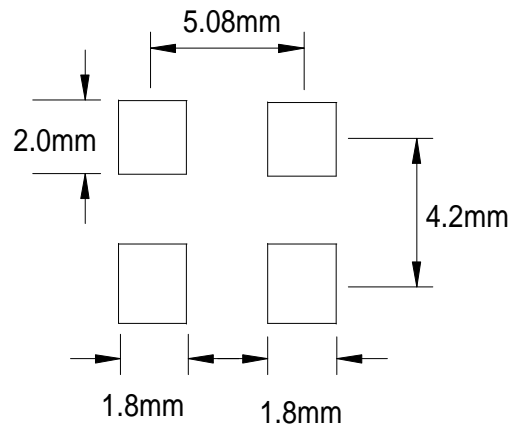
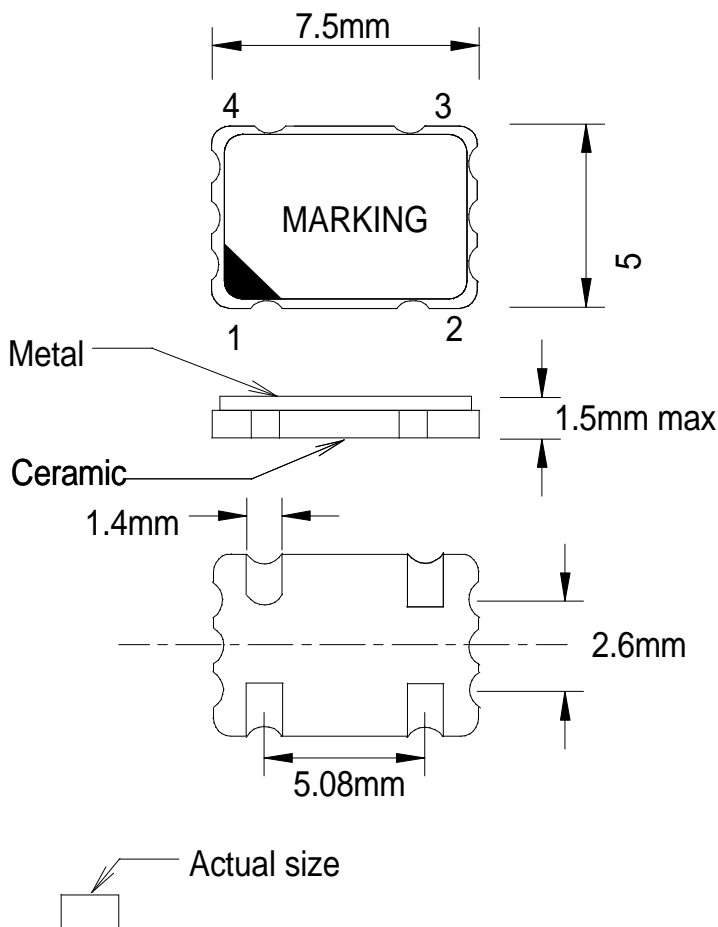
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PO BOX 335 VERMONT VIC 3133.
PHONE 03 9764 1311 FAX 03 9764 1602

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SURFACE MOUNT OSCILLATORS

SMO 190 / MIN30AS-T

FREQUENCY	1.8 - 50 MHz
STABILITY	± 100 or 50 ppm SPECIFY AFTER THE PART No IE 50MHz MIN30AS-T-50PPM
OPERATING TEMP RANGE	-10 +70°C
INPUT VOLTAGE	+3.3v DC ±0.3V
INPUT CURRENT (MAX)	12mA 1.8-32 MHz 17mA 32-50 MHz
SYMMETRY @ 2.5V	45/55%
RISE/FALL TIME (0.33-2.97)	7 nS MAX
ENABLE INPUT	2.2 V Min @ 0.4mA
DISABLE INPUT	0.8 V Max @ 0.4 mA
OUTPUT CURRENT	0=10mA 1=10mA
OUTPUT LOAD	CMOS 15PF
PIN CONNECTIONS	# 1 E/D # 3 OUTPUT # 2 GND # 4 +3.3V DC



SUGGESTED PAD LAYOUT



ABN No 90 004 849 245

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1/9 HI-TECH PLACE ROWVILLE VIC 3178
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AUSTRALIA (61)

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SURFACE MOUNT CRYSTALS

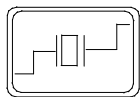
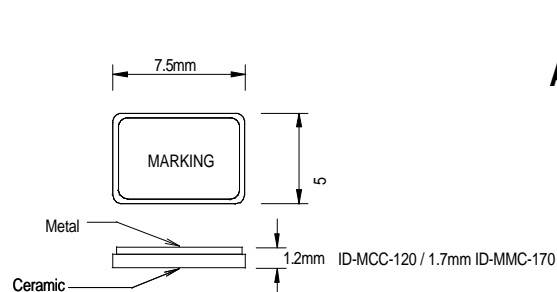
TYPE ID-MCC-120 & ID-MMC-170

Specifications

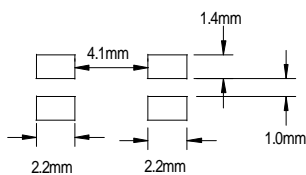
Frequency Range	10-100 MHz
Frequency Tolerance @ 25°C	± 50ppm (available to ± 10ppm)
Operating Temperature Range	-10 °C to + 60°C
Temperature Stability	± 50ppm (available to ± 10ppm)
Drive Level	0.1mW

Mode	CL	ESR	CL available also in 18 20 30 pf or customer specified 5K Min.
Fundamental	16pf	60Ω	
Fundamental	16pf	40Ω	
3rd overtone	Series	60Ω	
5rd overtone	Series	80Ω	

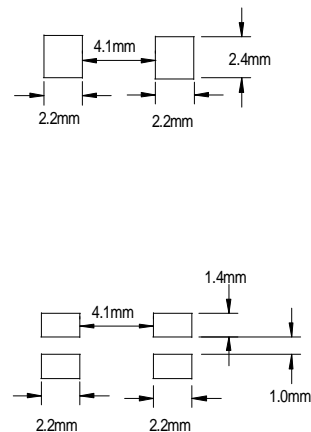
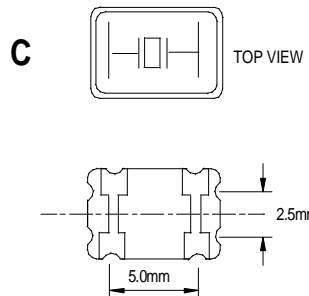
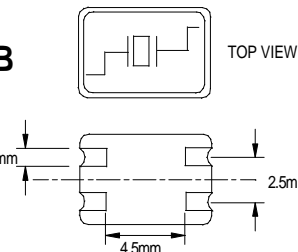
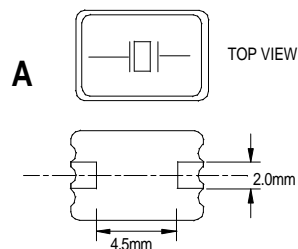
ID-MCC-120



TOP VIEW



SUGGESTED PAD LAYOUT



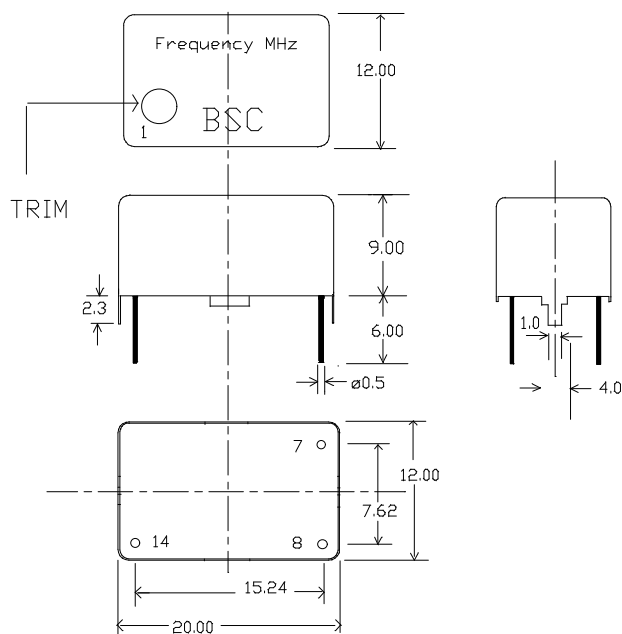
SUGGESTED PAD LAYOUT



**1/9 HI-TECH PLACE ROWVILLE VIC 3178
PO BOX 335 VERMONT VIC 3133.
PHONE 613 9764 1311 FAX 613 9764 1602
E-Mail brightstar@primus.com**

Temperature Compensated Crystal Oscillator

<div>TYPE</div> <div>PXO-1809</div>	Frequency Range	Stability	Calibration @ 25 °C
	10 to 24.000 MHz	/A ±2.5ppm -30 to 75°C	±5 ppm (trimmer adjustment) ±15ppm
		/B ±1.5ppm -30 to 75°C	Ageing <1ppm/year
		/C ±1.0ppm -30 to 75°C	
	Output Level		Output load
	1V p-p min clipped sine wave		20K/5Pf
	OUTPUT	Rise / Fall	Supply
	Sine Wave	TR/TF< 5 nS	+5 Volt ±5% 7mA



1 NC not fitted
7 Ground
8 Output
14 +5 Volt



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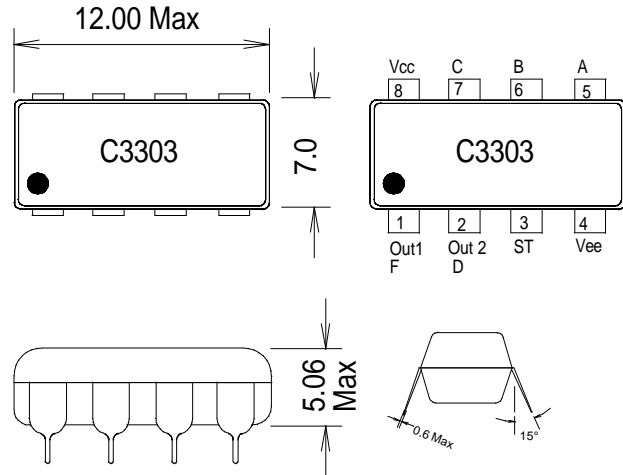
1/9 HI-TECH PLACE ROWVILLE VIC 3178
PO BOX 335 VERMONT VIC 3133. AUSTRALIA
PHONE 03 9764 1311 FAX 03 9764 1602

ABN No 90 004 849 245

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Minature C-MOS Oscillator

Model	C3303/ EXO-3
Frequency Range	46.875 Khz - 24 MHz
Frequency Stability	$\pm 100 \times 10^{-6}$
Temp. range Operating	-10 ~ 70°C
Temp. range Storage	-55 ~ 125°C
Voltage Range	+3V min +6V max
Supply Current	10 mA Typ/16 MHz
Output type	CMOS
Level	.2 to .9Vcc
Symmetry	50 \pm 10%
Output load	50Pf or LS-TTL10



FREQUENCY OUTPUTS

0 1/2 MHz	1/2	2 1/2	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2
12.000	6.000 MHz	3.000 MHz	1.500 MHz	750 KHz	375 KHz	187.5 KHz	93.75 KHz	46.875 KHz
12.288	6.144 MHz	3.072 MHz	1.536 MHz	768 KHz	384 KHz	192 KHz	96 KHz	48 KHz
12.800	6.400 MHz	3.200 MHz	1.600 MHz	800 KHz	400 KHz	200 KHz	100 KHz	50 KHz
14.31818	7.15909MHz	3.579545MHz	1.798772MHz	894.88KHz	447.44 KHz	223.72KHz	111.86KHz	55.930KHz
14.7456	7.3728MHz	3.6864MHz	1.8432MHz	921.6KHz	460.8 KHz	230.4KHz	115.2 KHz	62.4 KHz
15.944	7.9872MHz	3.9936MHz	1.9968 MHz	998.4KHz	499.2 KHz	249.6 KHz	124.8 KHz	62.4KHz
16.000	8.000 MHz	4.000 MHz	2.000 MHz	1.000 MHz	500KHz	250KHz	125KHz	62.5 KHz
16.384	8.192 MHz	4.096 MHz	2.048MHz	1.024MHz	512KHz	256KHz	128KHz	64KHz
17.73447	8.867238M	4.433619M	2.216809M	1.1084Mz	554.2KHz	277.1KHz	138.55KHz	69.275KHz
18.432	9.216MHz	4.608MHz	2.304MHz	1.152MHz	576KHz	288KHz	144KHz	72KHz
19.6608	9.8304MHz	4.9152MHz	2.4576MHz	1.2288MHz	614.4KHz	307.2KHz	153.6KHz	76.8KHz
20.000	10.000MHz	5.000MHz	2.500MHz	1.250MHz	625KHz	312.5KHz	156.25KHz	78.125 KHz
24.000	12.000MHz	6.000MHz	3.000MHz	1.500MHz	750KHz	375KHz	187.5KHz	93.75KHz

FUNCTION TABLE

Input			Output		
Select			ST	F	D
C	B	A			
X	X	X	L	L	L
L	L	L	H	Fo clock	fo/2 clock
L	L	H	H	Fo clock	fo/2 ² clock
L	H	L	H	Fo clock	fo/2 ³ clock
L	H	H	H	Fo clock	fo/2 ⁴ clock
H	L	L	H	Fo clock	fo/2 ⁵ clock
H	L	H	H	Fo clock	fo/2 ⁶ clock
H	H	L	H	Fo clock	fo/2 ⁷ clock
H	H	H	H	Fo clock	fo/2 ⁸ clock